



Integrated Pest Management in Schools: Basics for Winter

In collaboration with the American Lung Association of the Mid-Atlantic

Wednesday, November 28, 2012
12 – 1 p.m. ET



Indoor Air Quality (IAQ)

Today's Webinar Presentation and Materials

- The PowerPoint slides, a Questions and Answers document and a list of resources will be available to you in a few weeks on the *IAQ Tools for Schools* website:

www.epa.gov/iaq/schools/webconferences.html.

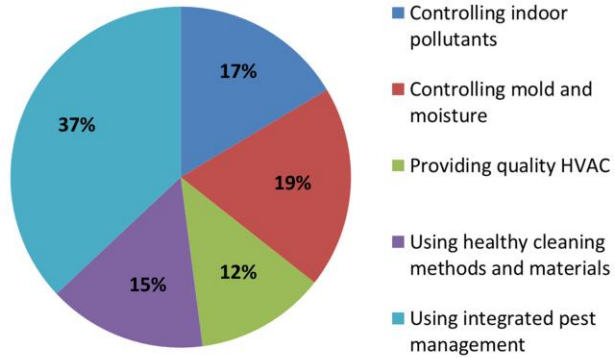


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If you are interested in downloading presentation slides from this webinar or previous webinars, please visit EPA's webinar resource page listed in this slide. Along with PDF copies of presentation slides, you can also download the complete list of questions and answers discussed today as well as any additional resources affiliated with this topic.

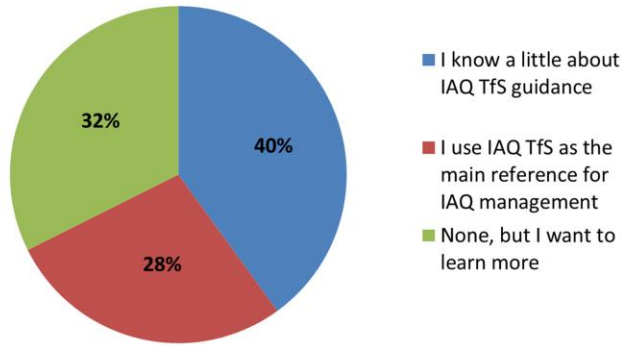
Polling Question 1

What is the most pressing IAQ issue at your school or the schools that you work with?



Polling Question 2

What is your knowledge of EPA's *IAQ Tools for Schools* (IAQ TfS) guidance?



Introductions

Facilitator:

- Cristina Schulingkamp, Senior Environmental Engineer, U.S. Environmental Protection Agency Region 3

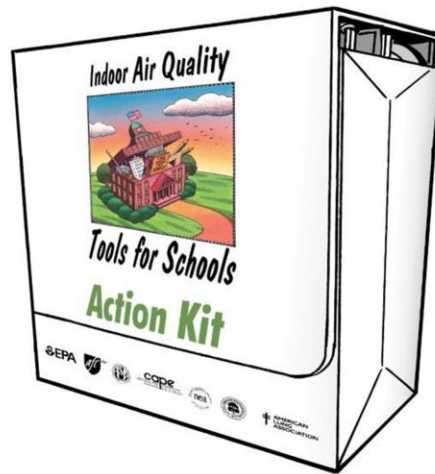


Presenters:

- John J. Butler, Regional Pesticide Expert, U.S. Environmental Protection Agency Region 3
- Dion Lerman, Environmental Health Educator, Pennsylvania Integrated Pest Management (PA IPM) Program/Penn State Extension



IAQ Tools for Schools Guidance



Indoor Air Quality (IAQ)

IAQ Tools for Schools Guidance

Addresses the main causes of IAQ problems!

This is the main brand that most of you may be familiar with regarding IAQ management in schools and EPA

The Framework for Effective School IAQ Management

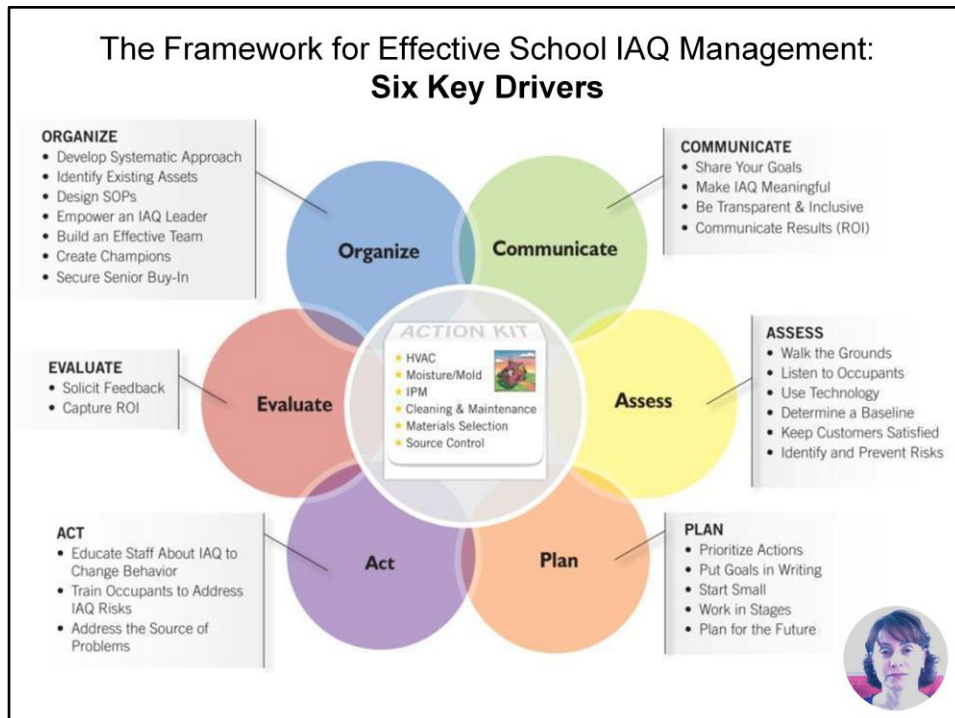


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EPA organized that knowledge into a framework of proven solutions – the **Framework for Effective School IAQ Management**.

The Framework provides a common language to describe the drivers of IAQ program success; offers detailed guidance on the proven strategies, organizational approaches, leadership styles that are fundamental to program effectiveness; and presents a clear vision of the pathway to school IAQ excellence.

Its highly flexible and adaptable structure allows any school, regardless of location, size, budget or condition, to use the Framework to launch, reinvigorate and sustain an effective IAQ management program.



By applying a cycle of continuous assessment, planning, action and evaluation, the Six Key Drivers work together to deliver effective school IAQ management programs, but can also be applied to other management systems within a school district as well.

Here are the Six Key Drivers:

Organizing your program.

Communicating with everyone, all of the time.

Assessing your school IAQ environment and how occupants are doing continuously.

Planning your short- and long-term actions based on your assessments and other important factors.

Acting to solve or prevent IAQ problems and address structural, institutional and behavioral issues.

Evaluating your results and the impact of your program for continuous improvement.

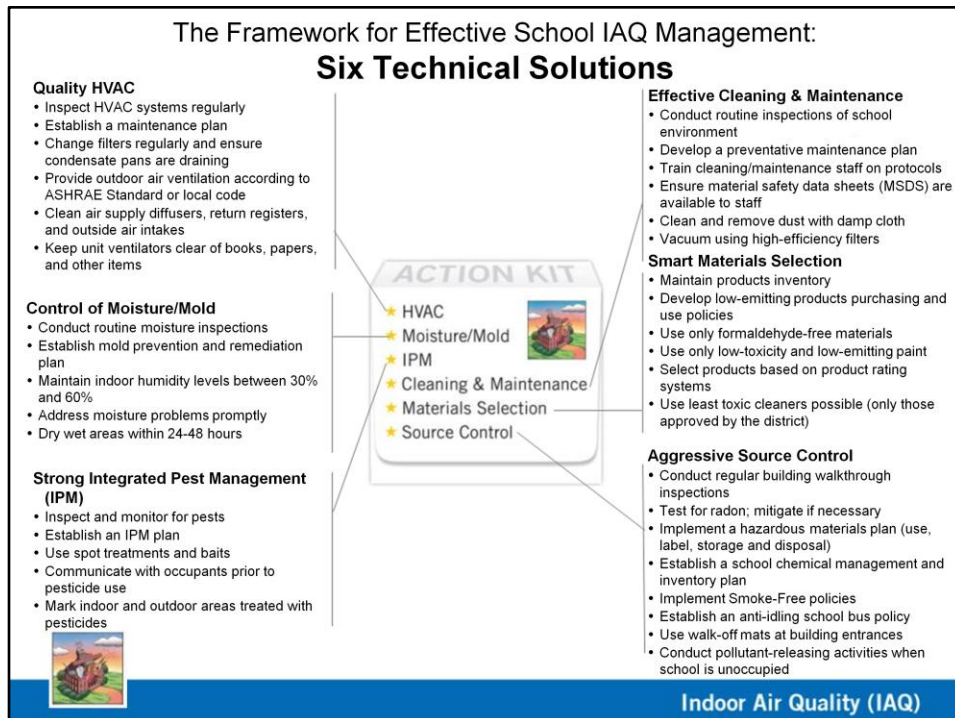
The Framework for Effective School IAQ Management: **Six Technical Solutions**



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The Six Technical Solutions define the most common issues that schools need to address to effectively manage IAQ risks.

When addressed systematically and aggressively, an IAQ program that focuses on the Six Technical Solutions will deliver a healthier school environment.



The Six Technical Solutions are:

Ensuring **Quality** inspection, operation and maintenance of your **HVAC** system.

Active, aggressive **Control of Moisture/Mold**.

Strong Integrated Pest Management.

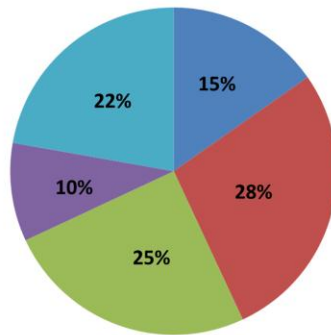
Effective, consistent **Cleaning & Maintenance** activities.

Smart low-emitting, low toxicity **Materials Selection**.

Aggressive Source Control, for example through anti-idling school bus policies, radon testing or proactively managing your schools chemical inventory.

Polling Question 3

What is your main challenge to implementing an IPM program in your school or school district?



- Getting buy in from peers
- Getting buy in from upper management
- Hard to fit in with my other responsibilities and priorities
- None, we have a successful IPM program
- Not enough funding





U.S. Environmental Protection Agency School IPM Program

John J. Butler
Regional Pesticide Expert
U.S. EPA Region 3



Indoor Air Quality (IAQ)

School IPM Program

Goals:

- Promote verifiable & ongoing School IPM in K-12 *Public* Schools in the Region 3 States (DC, DE, MD, PA, VA, WV)
 - In all school buildings
 - On school grounds, including: landscapes, playgrounds and athletic fields
- EPA Protect Children's Health



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The goal of EPA's school IPM program is to promote a verifiable and ongoing school IPM in K-12 public schools. In Region 3 that would include the District of Columbia, Delaware, Maryland, Pennsylvania, Virginia, and West Virginia. This includes in all school buildings as well as on school grounds, including landscapes, playgrounds, and athletic fields. But the ultimate goal of the program is to protect children's health.

School IPM Program

Vision:

- All of the nation's children be covered by a verifiable and ongoing school IPM program.

Mission:

- Build partnerships and collaborations to promote and support school IPM.
- Demonstrate the value of school IPM.
- Provide information about tools available to schools interested in developing a SIPM program.



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With that said, the vision of the program is for all the nation's children to be covered by a verifiable and ongoing school IPM program, looking for a program that is sustainable here, a sustainable program. EPA is taking a wholesale approach with the program with a mission to build partnerships and collaborations to promote and support school IPM, as well as to demonstrate the value of school IPM in school districts.

In the regions and throughout the program areas, we provide information about tools available to schools interested in developing a school IPM program. This could be answering questions, providing guidance, giving some examples, and providing technical assistance and outreach education. But the program is not an enforcement program, it's certainly compliance assistance or helping schools answer their questions and build an IPM program. Here in Region 3, our primary focus is to meet and assist the school districts within the region.

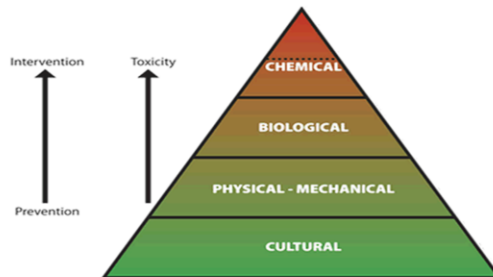
Build Awareness for IPM

IPM is a sustainable approach to managing pests by combining:

- Biological,
- Cultural,
- Physical, and
- Chemical tools

In a way that minimizes:

- Economic,
- Health and
- Environmental risks



Indoor Air Quality (IAQ)

Through the program, EPA is building awareness to IPM that is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools to minimize the economic health and environmental risk.

Verifiable School IPM

5 Documented Elements:

1. Identify and understand your pests.
2. Setting action thresholds for key pests.
3. Monitoring for pests, their locations and populations.



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Verifiable school IPM has five documented elements. The first of those is to identify and understand your pests. In other words, know that biology of the pest, become familiar with the pest. The second element is setting action threshold for those key pests. In other words, what are the action population levels before you need to take some kind of action?

The third element is monitoring for those pests, their locations and populations. In other words, throughout the school grounds and in the school, you are doing scouting and monitoring pest levels and identifying pest populations.

Verifiable School IPM (cont.)

4. Removing conditions that allow for pest infestation.
5. Using one or more effective pest control methods including:
 - Sanitation
 - Structural maintenance
 - Non-chemical methods
 - In place of, or in combination with, pesticides

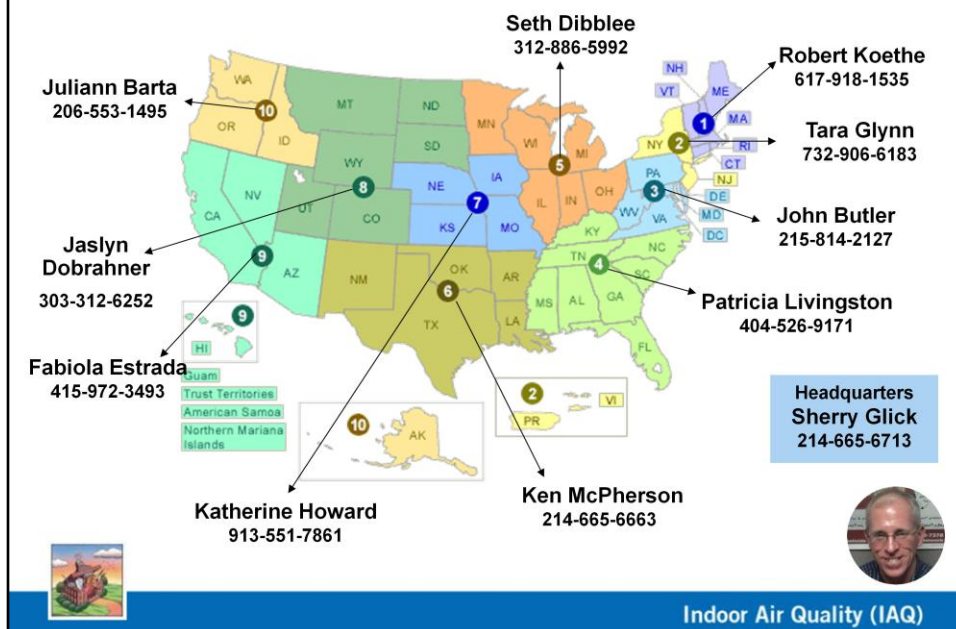


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Continuing with the elements, the fourth one is removing conditions that allow for pest infestation. This could be food around in cafeteria areas or outside around dumpsters. It could be opened doors or trash, you know, boxes piled up from a place where it might be a habitat for pests. And the fifth element is using more and more effective pest control methods including sanitation, structural maintenance, and non-chemical methods in place or in combination with pesticides.

These five elements are the focus of the EPA school IPM activities.

National EPA School IPM Team



And finally, within each EPA region, there is a school IPM coordinator. The map that you should be seeing shows the 10 EPA regions and the corresponding school IPM contact in that region along with identifying the headquarter contact, Sherry Glick, for school IPM. I certainly encourage you to contact the school IPM coordinator in your individual region and see how they might be able to help you out in developing a verifiable and ongoing school IPM program within your individual schools.



IPM in Schools: Wintertime Basics

Dion Lerman, HHS

Pennsylvania Integrated Pest Management (PA IPM) Program/Penn State Extension



What we're going to be doing today is focusing on the opportunities that the season gives us with IPM.

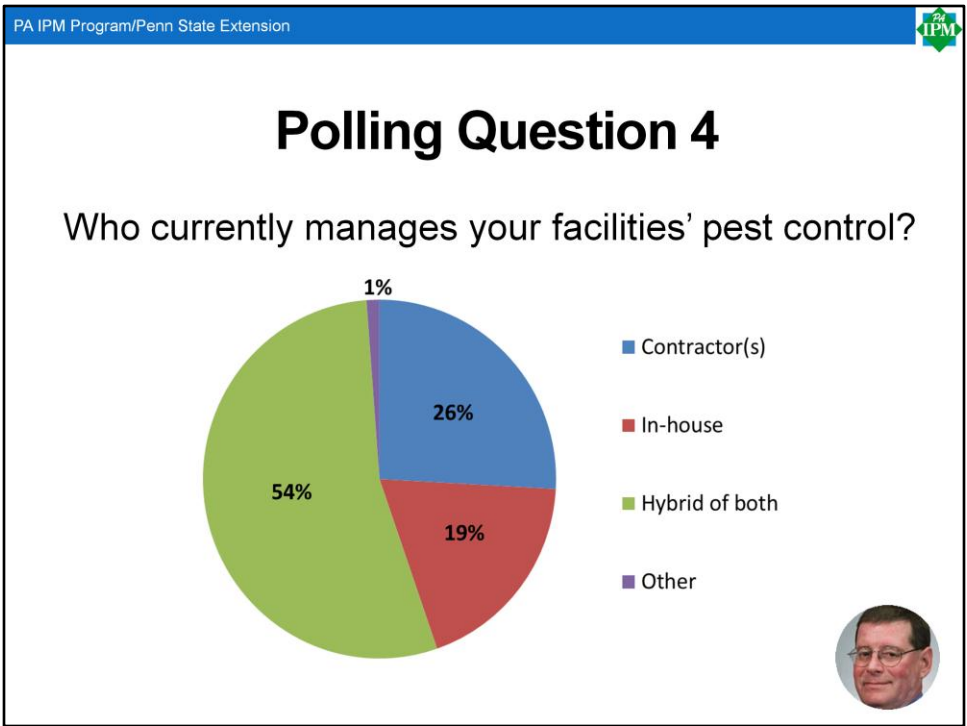
Today's Topics:

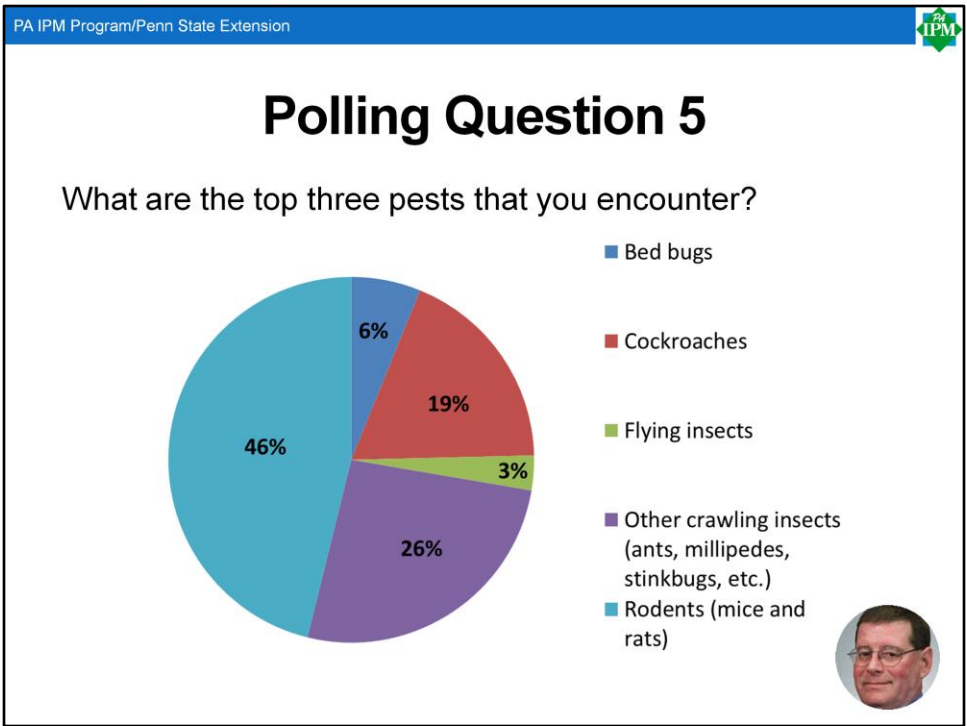
- Pests and their impact
- Winterization: Exclusion opportunities
- Pest reduction
 - Allergies & Asthma triggers
 - Interventions: Effective and *Ineffective!*
 - Health results
- Resources



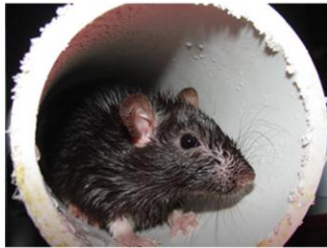
Today's topics, we're going to be looking at pests and their impact primarily on health and at the opportunities that the season provides us and focusing primarily on how to reduce pests and the impact that they have on us from allergies and asthma. Remember, in winter we're indoors more, which means we are ventilating less with fresh air, so we have more effective exposure to the allergens that pests leave behind. We're going to be looking at what are effective interventions, and which ones we don't recommend, that provide a good health result.

And finally I will point out that there are some slides at the end that list resources, everything that I mention in the course of this presentation. All the various websites are available at the end.





By the end of the session,
you will be able to:



Norway rat (*Rattus norvegicus*)

Photo credit: Orkin, Inc./CDC

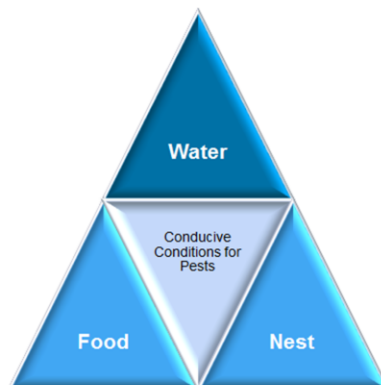
- Explain the opportunities seasonal IPM provides
- Explain the connection between pests & asthma
- Describe effective pest management tools and techniques



By the end of this session, you will be able to explain the opportunities that this season provides us for IPM, explain the connection between pest and asthma, and describe effective pest management tools and techniques.

Integrated Pest Management

- Multiple methods to control pests
 - Not *one* solution!
- Prevention & sanitation
 - Exclusion
- Traps
 - Low risk pesticides
- Maintenance



So Integrated Pest Management, as John was describing—here we go—uses multiple methods to control pests. Basically, all critters are out there looking for three things. So we see in the triangle food, water, and a place to hide are the conditions that we need to have for pests to be able to survive, and so pests seek for these resources. On the other hand, if we deny pests these resources, they're unable to continue to exist.

So IPM is really a prevention-based strategy where we're trying to take away their food, water, and shelter, what we called the "conducive conditions" that allow pests to exist. We do that through extreme sanitation, making sure there is no food or water for them to drink, and through exclusion and denial of access, so that they have no place where they can get into our buildings and no place where they can hide or nest once they're inside.

Our preferred method for getting rid of existing pest populations would be using traps and other non-chemical means. However, we do use low-risk pesticides when necessary; we'll mention that more later. Finally, maintenance is an essential part of Integrated Pest Management, because it's through failures in maintenance that the pests are actually able to gain access and gain resources.

Problems caused by pests:

- Aesthetic
- Structural
- Nuisance
- Health
- Fire Hazard
- Educational Disruption



Cockroaches on table



Mouse gnawed electrical wire



Asthma may be triggered by pests



Mouse crushed in printer



So if we look at the problems that pests can cause, we can see that there are aesthetic problems, that is, we don't like the way they look. We don't like to see cockroaches. There are structural problems. Mice can, for instance, can gnaw on electrical wires and cause fires. They are indeed a nuisance problem, coming into the morning finding a mouse crushed in your printer, probably constitutes an aesthetic problem as well as nuisance problem.

Primarily in this webinar, we're going to be focusing on health issues. However, as I've already noted, they can be a fire hazard and they can certainly disrupt the educational process. Nobody likes to see mice or cockroaches in their rooms at all.

Health effects of pests

- Bites
 - Mosquitoes, bed bugs, fleas, ticks, rats
- Spread infectious diseases
 - Rats, mice, cockroaches, flies, ticks, mosquitoes
- Asthma: rate has doubled in 20 years
 - Over 10% of school age children, nationally
 - Main cause of lost school days



Asian Tiger Mosquito



Deer tick



Blow fly



So pests, allergies, and asthma are intricately connected. Many pests can cause health effects—bites. Mosquitoes, bedbugs, flea, ticks, all bite of course. And many of those same things spread infectious diseases. But our main concern is actually asthma.

Asthma rate in schools has basically doubled over the last 20 years. Over 10 percent of our school-age children nationally are diagnosed with asthma and in many places it's much higher than that. In Philadelphia, it's over 20 percent. In some neighborhoods, over 50 percent of our school-age children.

Asthma is now recognized as the main cause of lost schooldays, which you should also realize also means lost workdays because every time a child stays home, an adult has to stay home as well.

Pests, Allergies & Asthma



- Pest allergens are main triggers of asthma in urban areas:
 - Dust mites – allergens in feces (Der p 1)
 - Cockroaches – allergens in feces (Bla g 1 & 2)
 - Mice – allergen in urine (MUP)
- Health effects greater for children
 - Breathe more air; eat & drink more
 - Growing bodies, organs & systems
 - Effect on activities & learning



So the direct connection to pests is that the pests are a source of allergens. In fact, pest allergens are now recognized as the main trigger of asthma in urban areas. The main pest to allergen—asthmagen, that would be allergies that trigger asthma—would be dust mites who expressed an allergen in their feces, cockroaches also their feces, and mice who expressed the allergen in their urine.

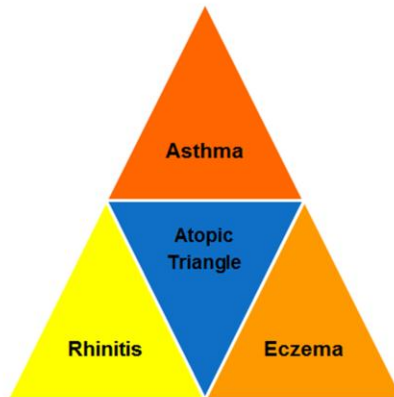
And remember, since we're talking about schools, we're talking about what are their effects on children. And in general, health effects on children are greater than on adults. This is because children breathe more air than adults do, pound for pound. They eat more and drink more proportionally than we do.

They also have obviously growing bodies. Their organs and systems are still growing and developing, so they may be, on the one hand, less able to interact successfully with problem substances, and also the effect of those things on their bodies may be greater. And of course, since we're in school, we're also concerned with what is the effect on their ability to learn and their ability to participate in activities as well. If they are having serious allergy attacks, or if they are having asthma attacks, this is going to impact their abilities.

So what we're going to do now is look at our major allergens and where they come from. I'll give you some information about each of them.

The Atopic Triangle Asthma, Allergies and Eczema

- Food allergies & other allergies
 - Conditions commonly coexist; interact and cross-react
- Environmental conditions more important than genetics
 - Eliminating conditions reduces symptoms



Now, asthma is part of what's called the atopic triangle. Asthma, allergies, and eczema are commonly coexisting, they interact and they cause-react with each other and with food allergies and other kinds of allergies. What this means is that if somebody has allergies that they are more likely to react and react in a more severe way to pest allergies.

And it turns out that, while of course genetic predisposition is important, environmental conditions are more important than genetics and that people will develop allergies or asthma if the environmental conditions are sufficiently bad. On the other hand, eliminating the conditions does in fact reduce the symptoms.

Gern, JE, and WW Busse, *Contemporary Diagnosis and Management of Allergic Diseases and Asthma*, 5e. 2008:Newtown PA, Handbooks in Healthcare Co. p.5ff.

Dust mites



- North American House Dust Mite (HDM): *Dermatophagoides farinae*
- Feces contains the allergen
- Live in bedding, carpets, upholstery, stuffed animals, etc.
 - Special areas in most schools
 - Areas where sensitive students are likely to be
- Do not thrive below 50% or breed below 40% RH (Relative Humidity)



What we're going to do now is look at our major allergens and where they come from. I'll give you some information about each of them. Dust mites. The North American house dust mite is the main problem. As you can see, they are very small, that's a microscopic slide blown up. And those dots that you can see sort of in the upper-middle of the slide, that's the feces, and that's what contains the allergen. They live in bedding, carpets, upholstery, stuffed animals—and the good news is that we don't have a lot of that in most schools.

The not-so-good news is that where we do have those areas are where sensitive students are most likely to be. So where are we going to have upholstered areas? In lower school, preschool areas, possibly reading nooks, special education areas, lounges, infirmaries. So they do require some consideration. The good news is that you can actually use your HVAC system as part of this, because dust mites do not survive below 50 percent or breathe below 40 percent relative humidity.

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Cohn RD, Arbes SJ, Yin M, Jaramillo R, Zeldin DC (June 2004). "National prevalence and exposure risk for mouse allergen in US households". *The Journal of Allergy and Clinical Immunology* **113** (6): 1167–71. [doi:10.1016/j.jaci.2003.12.592](https://doi.org/10.1016/j.jaci.2003.12.592). PMID 15208600. [^](#)
Phipatanakul W, Eggleston PA, Wright EC, Wood RA (December 2000). "Mouse allergen. I. The prevalence of mouse allergen in inner-city homes. The National Cooperative Inner-City Asthma Study". *The Journal of Allergy and Clinical Immunology* **106** (6): 1070–74. [doi:10.1067/mai.2000.110796](https://doi.org/10.1067/mai.2000.110796). PMID 11112888. [^](#) Cohn RD, Arbes SJ, Yin M, Jaramillo R,

Zeldin DC (June 2004). "National prevalence and exposure risk for mouse allergen in US households". *The Journal of Allergy and Clinical Immunology* **113** (6): 1167–71.
[doi:10.1016/j.jaci.2003.12.592](https://doi.org/10.1016/j.jaci.2003.12.592)

[Ann Allergy Asthma Immunol.](#) 2009 Feb;102(2):125-30.

Mouse allergens in urban elementary schools and homes of children with asthma.

[Sheehan WJ](#), [Rangsithienchai PA](#), [Muilenberg ML](#), [Rogers CA](#), [Lane JP](#), [Ghaemghami J](#), [Rivard DV](#), [Otsu K](#), [Hoffman EB](#), [Israel E](#), [Gold DR](#), [Phipatanakul W](#).

Source

Division of Allergy and Immunology, Department of Pediatrics, Children's Hospital, Boston, Massachusetts 02115, USA.

Abstract

BACKGROUND:

The association between allergens in schools and childhood asthma has not been well studied, particularly in the United States.

OBJECTIVE:

To investigate allergen exposure in schools compared with homes with a specific focus on children with asthma.

METHODS:

Dust samples were collected from 46 rooms in 4 urban elementary schools (northeastern United States) and from 38 student bedrooms. Samples were analyzed for cat (Fel d 1), dog (Can f 1), cockroach (Bla g 2), dust mites (Der f 1/Der p 1), and mouse urinary protein (MUP). Questionnaires identified students with physician-diagnosed asthma.

RESULTS:

Cat and dog allergens were detectable in most school samples (96% and 78%, respectively), but at low levels. Cockroach allergen was detectable in only 11% of school samples. Mouse allergen was detectable in 89% of school samples, with 68% having MUP levels greater than 0.5 microg/g. In contrast, MUP was detectable in only 26% of bedroom samples. Matched classroom and home samples from 23 asthmatic students showed higher geometric mean MUP levels in the classroom vs the home (6.45 microg/g vs 0.44 microg/g, $P < .001$). However, there were lower geometric mean dust mite (Der f 1) levels in the classroom vs the home (0.04 microg/g vs 0.66 microg/g, $P < .001$).

CONCLUSIONS:

There are significantly higher levels of MUP but lower levels of Der f 1 in schools vs homes. It is important to recognize that children with asthma may encounter varying levels of allergens in environments outside the home, such as schools.

Researchers tested 937 inner-city children with moderate to severe asthma symptoms. The children, ages 5 to 11, were given skin tests for sensitivity to cockroach and dust mite allergens, pet dander, and mold. Bedroom dust samples were analyzed for the presence of each allergen type.

This study was part of the larger Inner-City Asthma Study, a cooperative multi-center project comprised of seven asthma study centers across the country.

<http://www.nih.gov/news/pr/mar2005/niehs-08.htm>

1-19-11

Mice

- Mouse Urinary Protein - MUP
- Found in 89% of elementary schools
 - 68% having significant MUP levels but below trigger level
- 95% of low income housing
 - 83% of all residences nationwide!
- Up to 18% of children sensitized
 - Associated with allergies & asthma
- Rats also allergenic; similar rates!



Mice express mouse urinary protein in their urine and unfortunately mice deposit their urine pretty much every place they go. And mouse allergens have been found in up to 89 percent of all elementary schools that have been surveyed.

Again, there is good news there that most of those have the allergen levels below the trigger level, about 68 percent. But that means that there is still 23 percent of our schools, 21 percent of our schools, that

have mouse allergen levels at a high enough level that's going to trigger asthma attacks in children.

Now, this compares with housing statistics. Ninety-five percent of all low-income housing nationwide contains mouse allergens and 83 percent of all residences nationwide. So children are already exposed to these allergens at home, and then they come in to school, where in fact, their attacks can be triggered by them again; about 18 percent of all children are sensitized. And I should also point out that rats also express an allergen that cross-reacts as well.

Cockroach allergens

1. Bla g 1 (German cockroach)
2. Bla g 2 (German)
3. Per a 3 (American)



Each dropping may contain enough allergen to trigger over 100 allergy attacks.

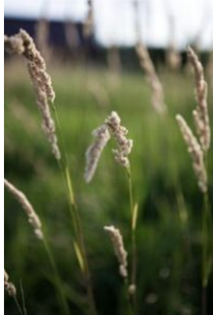
“Cockroach allergens have the greatest impact on childhood asthma in many U.S. cities...” NIH, 2005



Cockroaches actually express three allergens. There are two expressed by the German cockroach, which is your basic everyday average kitchen cockroach, the (LADs) 1 and 2. The American cockroach, the big brown water bug also has an allergen that cross-reacts.

Each dropping, which is the dot that looked kind of like coffee grounds that you see in cockroaches, each dropping may contain enough allergen to trigger over a hundred allergy attacks, each and every single dropping. This is why it's really important to clean up after cockroaches.

Weeds & Pollens



- Seasonal; identify allergen sources
 - Modify landscaping to remove allergens
 - Air quality alerts & pollen counts
- Avoid outdoor exposures at key times of year
 - Use air conditioning
- Air filters – should *not* generate ozone
 - HVAC system – MERV & HEPA; very effective
 - Room – less effective, but some relief
 - “Personal” – not effective



Weeds are considered a major asthma trigger, but since it's winter, we're not going to see a whole lot of that right now. But this is a good time to get rid of weeds or other landscaping things that have proved problematic and to establish a system where you're monitoring air quality alerts and pollen counts and have policies for how you're going to use that if you don't already.

The main advice on dealing with weed and pollen allergens of course is to avoid outdoor exposures at key times of the year, or in your case, since you're running buildings, is to use the air conditioning and to check their air filters. It is important that your air filter should not be generating ozone. And hopefully you have a central HVAC system where you can use MERV or HEPA rated filters, which are in fact very effective for removing these kinds of allergens from the circulating air.

Individual filters in rooms are much less effective, but will offer some relief. Personal air filters like you sometimes see people wearing around their neck are generally not very effective.

<http://www.aaaai.org/conditions-and-treatments/library/at-a-glance/outdoor-allergens.aspx>

Controlled – or *Out of Control*?

- Are you being effective?
 - Pests regularly sighted?
 - Scheduled pesticide applications?
 - Unknown problems or pests?
 - How long has the problem persisted?
- If you hesitated...
... time to do something *different*!



Is this inside your janitor's closet?



So the real question here is, are your pest issues out of controlled or out of control. And since I believe it was 45 percent of you said that you had a big problem with critters, 48 percent had a problem with rodents and mice, and 18 percent with cockroaches, maybe we don't have to ask this question.

But are you seeing pests regularly? Are your pesticide applications done on a regular scheduled basis, whether you need it or not? Do you have unknown problems or unknown pests? Have you had a problem that has persisted in spite of that pest control? Now, well, if you hesitated or answered yes to any of these questions, it's may be time for you to do something different.

So for instance, if you look at this photograph here hopefully, this is not your janitor's closet, because not only are there holes on the wall, but there's a lot of mouse feces on that Kroger bag there, proving that somebody is using those holes from the wall to come and go.

Change the conditions!


- Eliminate the reason *why* the pest is there
 - Pesticides treat symptoms, not causes
- Pesticides can trigger allergies & asthma
 - Pesticides and their residues can have health effects
- Children are especially vulnerable



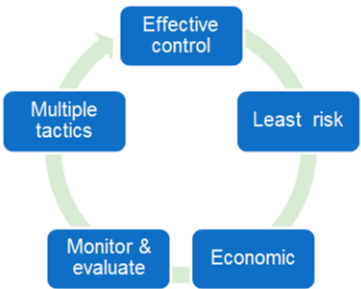
So what are we going to do? Again, we need to change the conditions that allow the pests to be there in the first place. We need to remove the resources that they are relying on. Eliminate the reason why the pest is there.

And this is in contrast to using a pesticide just to get rid of the pest. We could do that, but that's just treating the symptom, not the cause. Pesticides themselves can also trigger allergies and asthma, and their residues can have health effects and of course again, children are especially vulnerable to these problems.

PA IPM Program/Penn State Extension




IPM: Effective Control



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graph TD; EC[Effective control] --> LR[Least risk]; LR --> E[Economic]; E --> ME[Monitor & evaluate]; ME --> MT[Multiple tactics]; MT --> EC
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- Focus on prevention
 - Uses multiple methods
- Includes ongoing monitoring, evaluation and maintenance
 - Always chooses least-risk options
- Reduces costs and chemicals
 - IPM is *safe* practice
- IPM is *best* practice
 - NEA, EPA, HUD, NPMA, Extension



So in order to minimize to our exposure to both pests and pesticides, we're going to be using Integrated Pest Management to gain effective control. IPM, as I mentioned, focuses on prevention and uses multiple methods. It includes ongoing maintenance, monitoring evaluation and maintenance, and always chooses the least-risk option.

Using IPM reduces costs and chemicals and this has caused IPM to be recognized as both safe practice and the best practice. The National Education Association, the EPA, Housing and Urban Development, the National Pest Management Association, the Extension System, all recognized Integrated Pest Management as the safest and best pest control practices.

School IPM Laws

Michigan: The nation's first (12-98) state school IPM law.

- **39** states* now have some type of school pest management law or regulation in place.
- **23** states have a school IPM law or regulation.
- **31** states* have a minimum competency standard in place for persons using pesticides at schools.
- **25** states require schools to pre-notify parents and staff of upcoming pesticide applications.
- **18** states have reentry requirements or other beyond label requirements for pesticide applications at schools.
- **31** states* mandate the posting of signs for the application of pesticides at schools.
- <http://schoolipm.ifas.ufl.edu/Florida/regulatory.htm>

* and the District of Columbia



Many of you may also be mandated to use IPM. Many states have laws. Michigan was the nation's first, but we now have 39 states that have some kind of pest regulation, 23 having a specific IPM law or regulation, 31 minimal competency standards in place for people using pesticides in schools— that would be basically licensing — which is an important point for those of you that do in-house pest control. You need to make sure that you're in compliance with your state licensing requirements or other competency requirements.

Twenty-five states require pre-notification of upcoming pesticide application. Eighteen states have reentry requirements that go beyond what may be on the label, and 31 states mandate posting a sign that pesticides were in fact applied. You can get this information for each state at the University of Florida website that's listed here that will also be at the end of the workshop.

Winter IPM

*Weatherization opportunities are also **exclusion** opportunities!*

- Door sweeps: check all exterior doors, and rooms w/ exterior doors
- Wall penetrations: check & seal
 - Excluder – rodent seal
 - Sealants – beyond caulks
 - Receptacle seals – foam backers
- Window screens & seals: check, repair



Broken door sweep – *replace!*



Wall penetrations – *seal!*



So if we look at what we can do right now because it's winter? Winter is actually a good time if you're thinking IPM, because we're doing when we want our schools to be weather tight, which means it's a good opportunity to check for exclusion opportunities.

One of the big things to look for are door sweeps. Every exterior door should have a door sweep on it. And this type here that you see in the photograph with the brush is much more effective than the rubber type, which the mice simply chew through. It's also important, as well as being in good repair, that the door sweeps extend door to door, to the edge of the door, and there not be gaps since the mouse can get in where there is a quarter-inch gap.

Dr. Bobby Corrigan completed a study where he found that putting door sweeps on the exterior doors reduced mouse complaints by 65 percent. So they are quite literally coming in under the door.

As well as exterior doors, you should be aware that rooms that have an exterior door should have door sweeps on interior doors. So for instance, boiler rooms, other maintenance areas may have doors both into the school itself and to the outside, and those doors should be protected.

Wall penetrations. It's a good time to walk around outside and make sure that places where pipes are coming or other services coming into your building are properly sealed. There's a product called Excluder, which is very good for keeping rodents out.

Sealants beyond caulking. There are many different kinds of sealants that need to be used appropriately, and Dr. Bobby Corrigan, who I just mentioned, has written an excellent technical brief on this, which we will make available to you. It will be posted on the archive website with these notes at that time.

On the interior of your walls, there is a simple fix you can do that might be appropriate, which is to remove receptacle covers, switch plate, data plate covers and put foam backers behind them. These are designed for energy efficiency, but they are also effective in helping to prevent pests from being able to utilize those junction boxes.

Finally, you want to check window screens for holes and cracks and tears—either fix or replace them, since you don't need them this time of the year. And check window sills, make sure that they're intact, that they haven't broken, that you're not seeing condensation on multi-pane windows, which is going to reduce their efficiency and allow pests to enter around the edges of window sills.

Sanitation

- Leaves & landscape debris: remove/compost
 - Gardens
 - Food & cover for insects & rodents
 - Mold & fungus; moisture retention
- Dumpster placement: away from buildings
 - Food, access to interiors, odors
- Seasonal events: litter, trash & debris
 - In classrooms, offices, etc., or outdoors!
 - Food, harborage, nesting materials
- Dog waste
- Other animals – geese, deer



By the garden...



...a close look reveals a rat burrow!



The other big winter-time IPM bonus is around sanitation, in particular outdoor sanitation. Again, this is a good time to go around and see what's left lying about. The upper slide here, we have a garden that was actually a childcare center. But at the end of the season, they abandoned the garden of course and just walked away, leaving this pile of debris that you can see. Unfortunately, on closure check of that debris show that those piles there were actually covering a rat burrow.

So we want to make sure that we're not having those kinds of problems. Remove any debris, either dispose of it or compose it, make sure that there's no food or cover for insects and rodents, and try to remove harborages for mold and fungus, which as well is damaging our property, may help retain moisture.

Also check to make sure that dumpsters aren't creeping closer to the building in the wintertime. People don't like to walk far to throw the trash out, but of course that's going to attract pests and you want to keep those pests far away from the building.


We also have seasonal events this time of year that generate litter and trash and debris in quantities that may be larger than we're used to. So there may be parties or other events in classrooms or offices. There

may be things like tree lightings or carol singing or whatever outdoors. Again, they need to be cleaned up after.

It's easy for people to walk away from events outdoors because they're cold and want to get warm again. We want to make sure we're not feeding, providing nesting materials for things.


Another problem I've seen unfortunately in some areas that get heavy snow cover in the winter is that dog owners don't feel compelled to clean up after their dog. And in the springtime when the snow melts, the popular dog areas may be covered with large layers of dog feces. It's a truly disgusting problem. Hopefully, you can educate your dog owners not to do that.

Other animals may cause other problems. Geese of course are problem in much of the northeast. Some places have had excess in using Border Collies to scare away geese and keep them from congregating.

PA IPM Program/Penn State Extension

What works – and what doesn't

Pest	Primary	Local	Secondary	Don't use:
Dust mites	Remove habitat	Use encase-ments	Reduce humidity	Pesticides on mattresses, etc.
Mice	Exclude from building	Seal openings & nests	Monitor & trap	Rodenticides
Cockroaches	Sanitation!	Exclusion	Baits & gels	Sprays or foggers
Ants	Sanitation!	Exclusion	Baits & gels	Sprays or foggers
Bed bugs	Early detection	Inspection	Heat treatment	Sprays, foggers,



So what we're going to look at for much of the rest of this presentation here is specific pests and what works to control them and what doesn't. So here we have a summary slide and I'm going to break it down into what I call primary prevention, which is trying to prevent the pests in the first place. And then we have our local prevention, what we do to deal with it, when it exists, and secondary control if our prevention hasn't been adequate.

And then I've got some quick notes on what not to use. And you'll notice what we're doing here is working with that template that John showed you. We're at the base of our template. We had design and maintenance, and then we use physical controls, and then we use low toxicity pesticides app, and we try never to use the sprays and foggers at the very top of our pyramid.

Dust Mites

- **Primary Prevention**
 - Remove habitat
- **Local Prevention**
 - Use encasements for pillow & mattresses; wash
 - Freeze stuffed animals, etc. (7 days, 0°F)
- **Secondary control**
 - Reduce humidity below 50%
- **Don't use:**
 - Pesticides on pillow & mattresses, etc.



Dust mites (magnified)



Dust mite habitat at school...




So with dust mites, our primary prevention is going to be habitat removal. We already said there's not a lot of that in schools, but on the bottom photo you see the kind of situation that might exist. This is a reading nook, and those felt leaves definitely could harbor dust mites, and certainly the pile of cushions inside would be a primary habitat. So would use encasements for those pillows and make sure they got washed on a regular basis. We might remove those felt tiles as nice as they are.

Another control for dust mites that works is to freeze things. If you put stuffed animals in a plastic bag, in your cafeteria freezer, deep freezer for seven days that will kill dust mites.


Secondary control, as I mentioned earlier, would be to reduce humidity below 50 percent. We want to make sure that pesticides are not used on pillows and mattresses that children are going to be touching. Pesticides are absorbed through the skin quite effectively.

PA IPM Program/Penn State Extension




Mice


- Primary Prevention
 - Exclusion; door sweeps
- Local Prevention
 - Seal all openings; remove nests
- Secondary control
 - Traps (many kinds)
- **Don't use:**
 - Rodenticides in child accessible areas
 - Loose bait in other areas: **all** rodenticide must be in tamper-resistant bait stations



Easy-set mouse trap



Multiple-catch trap



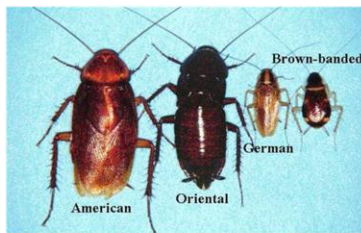
Mice. Our primary prevention for mice is going to be keeping them out and this can be challenging since the mouse can get through a hole as small as a dime or under a gap, for instance under a door of only a quarter of an inch. This is where door sweeps become really important, and sealing all openings and locally looking for mouse holes which are low to the ground and sealing them, removing all nests, checking drop ceilings for the presence as well.

We do have pests, mice, we prefer to use traps and which there are many kind. There is the old fashion wooden mousetrap, which we're all familiar with. The top photo shows a more contemporary easy-set mousetrap in which there are many styles. And the bottom shows a multiple-catch trap, which are frequently used in places like cafeterias, kitchens, mechanical and utility areas. These can actually catch several mice at a time.

Do not use rodenticides in child-accessible areas, period. Do not use rodenticides. And you may not use loose space in any other areas. EPA decision two years ago says that all rodenticide must be in tamper-resistant bait stations, and loose space applications are no longer approved.

Cockroaches

- Primary Prevention
 - Sanitation
- Local Prevention
 - Seal cracks & crevices
- Secondary control
 - Use bait stations & gels
 - Non-volatile
- **Don't use:**
 - Aerosol sprays; foggers



Main pest cockroaches



Bait Station & Gel Gun



Cockroaches. Again, our primary prevention here is sanitation. Cockroaches are looking for food. We want to make sure they don't have any. So their primary food are going to be crumbs, litter, and grease.

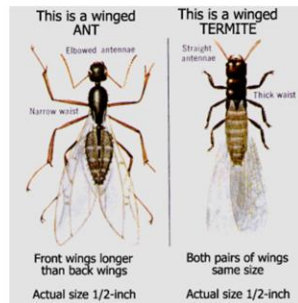
So in classrooms we're going to make sure that all food debris is cleared up and throw it away and the trash is removed at the end of the day after lunch, not before lunch preferably. We do not want to leave food trash in rooms overnight.

In the kitchen, grease removal is extremely important so equipment should be pulled out and the sides of equipment checked for grease buildup as well as the tops of surfaces of equipment.

Local prevention would be sealing of cracks and premises using caulks or other sealant so that cockroaches have no place to hide and breed. And our secondary control would be using bait stations and gels, which is a nonvolatile pesticide in very small amounts. These are extremely effective and very low-risk. We do not recommend the use of aerosol sprays and foggers should never be used in a school situation. They create far too much exposure.

Ants

- Primary Prevention
 - Sanitation
- Local Prevention
 - Exclude – seal/caulk all openings used by the ants
- Secondary control
 - Baits – placed at entry points
 - Outdoor bait stations available
 - Liquid/gels most effective
- **Don't use:**
 - Aerosols, sprays, granules



Ant bait stations



Our next critters that we're going to touch on very briefly are ants. Ants are not considered an allergen in most cases. They are a major nuisance pests in many schools. And again, the main prevention is sanitation and exclusion.

Why are they in our schools? Because they're looking for food, so we want to make sure they don't have any. So caulk and seal all openings as well that ants are using to get in. If we can't because they're coming in under our doors or under our windows and we can't seal those, we can use bait stations placed at their entry points. We find liquid and gel baits are more effective.

If you are having a persistent problem with the ants coming in from outdoors, check with your pest control operator. There are outdoor bait station systems available which can intercept the ants and prevent them from coming in. Again, please do not use aerosols or sprays against the ants. You're only going to kill workers, which does not in fact get rid of the problem.

We also don't recommend the use of granules on the outside. The granules are effective against ants, but they are also primarily consumed by non-target species, especially birds and other insects,

because the granules are spread over a large area and the ants are only going to encounter them in a very small place where the ants run. So the other stuff gets eaten by somebody else, so it's not a very effective control.

Bed Bugs

- Primary Prevention
 - Early Detection & Policy
- Local Prevention
 - Inspection & Identification
- Secondary control
 - Heat treatments
- **Don't use:**
 - Aerosol sprays or foggers
 - *Don't panic!*



Bed bug life cycle: egg-nymphs-adult

Photo: John Obermeyer, Rutgers University



Bedbugs; I'm also going to mention very briefly. Bedbugs are—many school districts are seeing bedbugs enter their schools—fortunately, although they may be introduced, schools are not good environment for bedbugs to become established into an infestation. There was an excellent EPA webinar on bedbugs in schools earlier this year that's archived on the same website that this will be up at and I recommend you to view that. The main thing I want to say here is that you should have policies about bedbugs and an early detection program to find them and prevent them from being established.

The preferred treatment is to use heat. Again, not aerosols or foggers and most especially not to panic if you find bedbugs. Like I said, you should have a policy. Please review the EPA webinar on bedbugs in schools for treatment suggestions.

Hidden benefits

- IPM Redefined (Boston Housing Authority)
 - I – **Invest** in your facility
 - P – **Protect** it from water & pest intrusion
 - M – **Maintain** it to save time, money & hassles
- Work order reduction (pests)
 - 64% first year; 50% each subsequent
 - Managers time – 40 hr/mo to 8 hr/mo!
- Pesticide reduction
 - US GSA – 85% reduction, 1995-2005 (Green, 2006)
 - Warehouses – 90% (Kells, unpub.)
 - Pittsburgh School District - 85% (Moio, unpub.)



So when we actually adopt these programs and start using them, we find there's some hidden benefit. In fact, the Boston Housing Authority, which was a very early adopter of Integrated Pest Management on an institutional basis, started realizing at one of their review meetings that IPM fits for more than just Integrated Pest Management. They figured out that it stood for investing in your facility, protecting it from water and pest intrusion, and maintaining it to save time, money, and hassles. So that IPM really means invest, protect, and maintain.

And in fact when they did this, they discovered that the first year they rolled out their IPM program, they had a 64 percent reduction in work orders related to pests and a 50 percent reduction in the next subsequent year. What that means is that the manager's time used to spend 80 hours or 40 hours a month on pests and that was reduced to eight hours or less.

Similarly, the GSA, General Service Administration that runs federal buildings, adopted IPM in 1995 and over the next 10 years saw an 85 percent reduction in both pest problems and the use of chemicals. (Stephen Kells) of the University of Minnesota has done a study where warehouses that adopt IPM has seen a 90 percent reduction in both

pests and the use of chemical and the Pittsburg School District which adopted IPM several years ago has seen about an 85 percent reduction as well.



Other Irritants, Allergens and Toxins: Cleaning Chemicals



I do want to finish off very briefly by just talking about area, allergens, and toxins that are in cleaning chemicals.

Why is it important to use environmentally preferable products?

- Each janitor uses about 200 pounds of chemicals annually.
- About 25% are hazardous substances.
- Janitorial workers have high rates of occupational asthma.
- Six out of 100 janitors are injured each year.
 - 20% are serious burns to the eyes or skin.
 - 12% are a result of chemical fumes.



You may not be aware of how many chemicals your janitors are using, about 200 pounds of chemical per person per year, about a quarter of which are hazardous resulting in very high rates of on-the-job injury, including serious burns and inhalation of chemical fumes.

Asthma/Respiratory Disease Related Ingredients

- Cleaners
- Disinfectants
- Volatile organic compounds – VOC's
 - Known or suspected to cause cancer
 - Propellants in aerosol containers - butane, benzene, propane, etc.
 - Solvents
- Fragrances – air fresheners
- Do not allow staff to bring in or use home products!



Many of these chemicals have ingredients that cause respiratory problems or asthma, including cleaners, disinfectants, VOCs, the propellants in aerosol containers, solvents, fragrances. These things are really problematic and you should have a district policy where you have carefully selected the cleaning supplies that are allowed in your facility and that other staff should be told not to bring in or use home products under any circumstances.

Disinfectants



- Are formulated to kill organisms
 - Can be toxic to humans as well as microbes
- Consider alternatives to chlorine bleach
 - Check requirements for safe & effective use
- May be corrosive
 - Require special handling!
- Keep away from children:
 - Mixing *or* using
 - **No** children in room!
 - No routine use of disinfectant wipes in classrooms
- Follow the label!
 - The label is the law!



In particular, we want to highlight disinfectants. Disinfectants have an important role in schools, of course. But you need to be aware that they are formulated to kill organisms and that they can be toxic to humans as well as microbes. We would ask you to consider alternatives to chlorine bleach and to check their requirements that they have for safe and effective use.

Remember, disinfectants especially bleach may be corrosive; bleach is corrosive. What that means is that for instance it causes irreversible damage to the eyes. These disinfectants will require special handling especially keeping them away from children, especially no mixing or using them in the room with children at any time. This includes no routine use of disinfectant wipes in classrooms.

Finally, we need to point out that the label is the law. You need to follow the label. Read the label before you use any chemical.

Antibacterial Soaps, Wipes and Washes

- Washing hands with soap and water just as effective - CDC
 - Accelerating antibiotic resistance, some linked to endocrine (hormone) disruption
- Harmful to sewage treatment
 - Harmful to algae and fish; may break down into harmful environmental contaminants
- Use “bland” soaps!
- **If hand sanitizers are used, only alcohol-based sanitizers should be allowed**
 - Storage is secured
 - Usage by children monitored to prevent ingestion



Again, antibacterial soaps are not recommended. They are accelerating antibiotic resistance. They are harmful to our sewage treatment and then they go in to the water supply themselves where they're harmful to fish and algae and may cause other environmental contamination. Please specify bland soaps.

If sanitizers are used, they should be alcohol-based sanitizers only, which break down in the environment, and those indeed need to have in secured storage and their usage monitored to make sure that children don't actually ingest the alcohol.

*CDC, Lynne Sehulster, PHD, Disinfectants Workgroup conversation
American Society for Microbiology, *How effective are antibacterial soaps and hand sanitizers against the viruses that cause “stomach flu”?*

**http://www.cdc.gov/ncidod/eid/vol7no3_supp/levy.htm

Environmentally Preferable Cleaning Chemicals

- Less-toxic chemicals from manufacturers and distributors
 - Third-party certification is important to ensure quality
- Common third-party programs are:
 - Design for the Environment – EPA <http://www.epa.gov/dfe/>
 - Green Seal (GS) – US <http://www.greenseal.org/>
 - EcoLogo – Canada www.ecologo.org
- Also, other sources of information:
 - American Lung Association; other non-profits
 - INFORM – Cleaning for Health www.informinc.org
 - Industry standards: paints, carpets, etc.



Finally, we have some certification programs that help you choose wisely, less toxic chemicals from manufacturers and distributors. There are many of these programs out there. Those most common are the design to the environment program that the EPA runs and you see their website, Green Seal, which is the longest and most established program and eco logo which comes out of Canada, but since the product here is distributed on both sides of the border you'll see it here and that's an excellent program as well.

Other sources of information include the American Lung Association and other non profits. Inform, which is devoted to the subject of cleaning supplies and health. They have an excellent website. There are also industry standards for many things including paints and carpets, but be aware these may not have a third-party certification.


More Resources

- Guide to Healthy Cleaning
 - Environmental Working Group (EWG)
 - Reviews & rates more than 2,000 household cleaning products with grades A-F,
<http://www.ewg.org/guides/cleaners>
- Green Cleaning in Schools
 - Industry sponsored, but comprehensive resources
 - <http://www.healthyschoolscampaign.org/>




Finally, a couple of resources available to you. The Environmental Working Group has again very good reliable information on cleaning supplies, and there's an excellent site on green cleaning in schools that has comprehensive resources. It is industry-sponsored and you should be aware of that, but it does have access to a wide variety of resources out there.

PA IPM Program/Penn State Extension



IPM Resources for Schools

- EPA IAQ *Tools for Schools* Guidance
 - <http://www.epa.gov/schools/>
- Pennsylvania IPM Program
 - <http://extension.psu.edu/ipm/schools>
- American Lung Association
 - <http://www.lung.org/healthy-air/school/>
- National School IPM Info & Listserv
 - <http://schoolipm.ifas.ufl.edu/INDEX.html>



And finally the last slide is going to show you the resources available from your sponsors here today, from the EPA, from my program which is the Integrated Pest Management Program in Pennsylvania, the Lung Association. I should also point out the National School IPM Information site and list serve. You should join the list serve, and you'll find the information about the regulatory information there.

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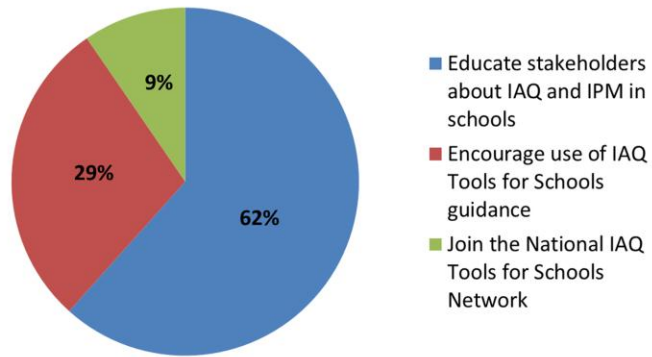
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- **http://www.cdc.gov/ncidod/eid/vol7no3_suppl/levy.htm



So this slide is an an incomplete list of resources or the references for this presentation; I apologize for it being incomplete. If you have questions about specific slide, please email me directly and I will be happy to tell you my sources.

Polling Question 6

After attending this webinar, the first action I will take is:



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Indoor Air Quality (IAQ)

Questions and Answers

Please use the questions/chat pane on your webinar console to send us your questions.



Indoor Air Quality (IAQ)

What is the correct response for managing bedbugs?

Dion Lerman:

OK. Well, again, I would encourage you to view the seminar, the EPA webinar on bedbugs in schools that is archived at the EPA and schools website, which really cover this in great detail.

You need to have good policies and you need to have an early detection program that allows you to recognize bedbugs when they come in. Bedbugs are introduced largely as hitchhikers so they'll frequently come in on the outer clothes or book bags or briefcases of students or staff. And so you need to be aware of that and recognize what a bedbug looks like and so you can identify what is a bedbug and what is not a bedbug. And then isolate that jacket or book bag or whatever it was to prevent the bedbug from getting out.

Actual control of bedbugs needs to be done by a licensed pest control operator. And so developing these policies is something that you're going to do in conjunction with your pest control operator and your administration staff as well.

Would you recommend owl stations at or near schools to control gophers and snakes?

Dion Lerman:

Well, if you can get real live owls to nest that's wonderful, but the plastic owls, no. Those are largely ineffective. Birds certainly identify them in which in a couple of days, gophers within a matter of days. I don't think the snake is actually going to look up and see a plastic owl. So no, I don't think that's going to be an effective control.

Does it really take seven days in the freezer to kill dust mites?

Dion Lerman:

Well, it might not. However, it depends a lot on what you're putting in the freezer. So if, for instance in stuffed animals, a stuffed animal is by nature an insulator. It's a lot of stuffing and so when the bug starts to get cold they're going to migrate into the center to try to retain their warmth. And so you have to be sure that you actually have penetrated the entire material and gotten it to the sub-freezing temperature for long enough that's why there's the recommendation of seven days.

If you're talking about something like books, it's actually a 30-day recommendation and this, by the way, freezing is a very effective way of getting rid of bug infestations in sensitive materials that are otherwise very difficult to do that with. So for instance if you had student records that had somehow become infested with bedbugs, those could be bagged in plastic and then frozen in a commercial deep freeze for period of a month, and they would be then considered safe and sanitary.

Could you speak a little bit more about the routine use of disinfectant wipes?

Dion Lerman:

Well, we've seen this occurring on a more and more recently. And in fact, the use of disinfectant is pretty thoroughly regulated and they should not be being used in places where there is not a need for them. In fact, disinfecting is recommended only in areas where there is feces or blood.

So rest rooms, yes, we use disinfectants in restrooms. Yes, we use disinfectants in infirmaries or if we're cleaning up spills of blood or other body fluids. But really that's not necessary in other places.

We do in food service. We use sanitizers. In daycare or childcare and young early childhood education, we use sanitizers on other surfaces. But we do not – those are not recommended even for use in schools on a routine basis.

In a situation where there has been outbreak of norovirus or flu, perhaps it may become useful to use them in high-touch areas on an interim basis during the time

where we are having the outbreak. But that would have to be a decision made by administration of the school nurse and should not be a decision made by an individual teacher.

Are the materials that stuffed toys are made from that are resistant to dust mites that we should look for?

Dion Lerman:

I have no idea on that one. In general, you want to make sure that the stuffing is contained that there are no rips in it because the stuffing is usually treated with flame retardants which can also provide unwanted exposures to children.

When removing mice nests, do you suggest training school personnel on the antivirus prevention or hiring professional pest control service?

Dion Lerman:

Oh, good question. Well, either hiring a professional service but definitely all maintenance staff should be aware of the risk of antivirus. Antivirus is spread—is carried by white-footed deer mice, not by the domestic house mouse. So in general, it's less of a risk. But if you have schools that are in rural or suburban areas surrounded by fields, which many of our schools are, certainly you have a risk of white-footed or deer mice entering your building particularly in the fall and winter time.

The problem with antivirus is that it is expressed into the feces of the mice and then the species over time dry out and disintegrate, turn into dust. And when we clean, if we inhale that dust, we're exposed to the virus. So the danger here is cleaning up mouse feces should always be done in a dustless fashion. Spray it down at least with water or with a very weak solution of water and bleach and then respirator at least and 95-dust masks or better should be worn during mouse feces clean up as, of course, should gloves as well.

Could you please briefly describe the distinction between disinfectant and sanitizers please?

Dion Lerman:

OK. Sanitizers are designed to reduce pathogens to levels that minimize the chances of people getting sick. Sanitizers are designed to destroy all organic—matter, all living things. The third level up from that of course is sterilization, which completely destroys all living things. So that's achievable only usually in medical situations.

So sanitizing we do to maintain our health. Disinfectants we do to make sure that pathogens are not transferred into the environment.

How long does it take to eliminate dust mites in an environment at 50 percent or below humidity? Is it faster than the freezing method?

Dion Lerman:

I'm not sure actually to be honest on that one. Any reduction through humidity is going to be gradual, because when you reduce the humidity you eliminate their ability to breed. So you still have to deal with the fact that you have an ongoing colony that's going to gradually decline. So it's not a fast fix, it's a long-term reduction strategy.

Is there any information that you could reference as far as responding to spiders?

Dion Lerman:

OK. Well, spiders of course are a predator. They're eating other bugs. And so if you have spiders, that means you have other bugs, which if you have some source of food entry and usually a moisture problem.

And so what you want to do is identify what the spiders are eating and where that is coming from, and that means probably fixing moisture problem, looking for a subtle routes of entry, for instance exterior lights are usually serviced by conduit that then leads into the building, and so lights may attract insects to the light. They then get into the light fixture and then simply follow the wires back into the building. And so that's the problem where you need to address sealing that conduit.

So the spiders themselves are not your problem. It's what the spiders are eating and you need to figure that out. Removing spiders is usually best done with the vacuum cleaner, because that way you don't run any risk of contact with them. Even though most spiders are incapable of biting, most people still don't want to get that close to them.